

Stored Waste Drum Image Analysis*

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Abstract

Tens of thousands of hazardous, radioactive, and mixed waste drums are being stored on an interim basis at Department of Energy (DOE) sites throughout the United States. Federal regulations require periodic inspections and inventory of all stored waste drums. All DOE waste storage facilities are currently being inspected manually. The Stored Waste Autonomous Mobile Inspector (SWAMI-II) is a robotics system developed by Savannah River Technology Center (SRTC) to provide remote inspection and survey of these drums in order to reduce both personnel exposure and the prohibitive costs associated with the current manual inspection techniques. In addition, providing accurate, high quality documentation to ensure regulatory compliance. The goal is to identify drums that are likely to develop leaks resulting in the contamination of the local environment. This requires methods which locate and identify indirect evidence such as rust spots, bulges, dents, and streaks. As a part of its sensor suit SWAMI-II is equipped with color CCD cameras and a structured lighting system for optimal image data acquisition. Lawrence Livermore National Laboratory (LLNL) was given the responsibility to select a suitable hardware system for the development of image processing algorithms required to identify suspect drums. SWAMI-II was deployed for field testing and evaluation at Fernald Environmental Restoration Management Corporation (FERMCO) in December 95.

This paper will discuss the difficulties encountered in the field at the FERMCO waste storage facility and the image processing algorithms developed by LLNL for the analysis of waste drum color images and geometry data.

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